

THE PREVENTION AND TREATMENT OF VULVOVAGINITIS IN CHILDREN.¹

BY FRED. J. TAUSSIG, M.D.,

ASSOCIATE IN GYNECOLOGY, WASHINGTON UNIVERSITY MEDICAL SCHOOL.

THE 66 cases of vulvovaginitis upon which this report is based occurred sporadically during the past eighteen months in girls varying in age from three weeks to twelve years, most of whom were referred from the St. Louis Children's Hospital Dispensary to the Washington University Gynecological Dispensary for treatment. Forty-three of these patients were investigated as to home conditions, possible source of infection, etc., by the social service department of the Children's Hospital. My thanks are due to Miss Stimson, the head of the department, and to Mrs. Marshall, who investigated most of the cases, for their kind coöperation and assistance. I also wish to thank Dr. Stewart, of the department of hygiene of the Board of Education, and the Visiting Nurses' Association for the assistance given me in the treatment of a large number of these cases.

The importance of gonorrheal vulvovaginitis in children lies not merely in the physical discomfort and occasional serious complications resulting therefrom, but in the moral shock produced upon the child and the family by the occurrence of this loathsome disease in the midst of the innocence of infancy and childhood. Possibly because it occupies a sort of midway position between pediatrics and gynecology, few specialists have given this disease the serious consideration it merits. The epidemics of vulvovaginitis that have from time to time invaded children's hospitals and institutions have aroused pediatricians to the contagiousness of this infection. The profession at large has not, however, seemed to realize that a condition so infectious in institutions must also be frequently transmitted from child to child, or through some other agency, outside of such hospitals or institutions. Particularly in schools, in tenements, in public playgrounds, etc., wherever children congregate in considerable number, and the same lavatories, towels, etc., may be used, we have conditions favoring infection. That the disease is far more common than was formerly supposed is being generally recognized. Seippel² estimates the number of cases occurring annually in Chicago at 500. Pollock³ believes that from 800 to 1000 girls are yearly infected in the city of Baltimore. The number of cases in this report coming from practically one

¹ Read before the St. Louis Medical Society, May 9, 1914.

² Cited by E. R. Spaulding, *Amer. Jour. Dis. Children*, 1913, v, 266.

³ *The Acquired Venereal Infection in Children*, Bull. Johns Hopkins Hosp., May, 1909, xx, 142.

source in eighteen months is evidence of the prevalence of this disease in St. Louis. Furthermore, Dr. Jeans, the resident pediatrician of the Children's Hospital, undertook over a period of five months a routine examination of all children coming to the Children's Hospital Dispensary to determine how frequently this condition passed unrecognized; 262 girls over one year old were examined, and whenever any moisture or secretion was seen it was examined for gonococci; 14 children were found to be infected, that is to say, about 5.3 per cent. of all girls coming to the dispensary. Only a small number of the 14 children in whom the infection was found came on account of the discharge.

ETIOLOGY. While in three of the cases that came under my observation the absence of gonococci and the character of the vaginal discharge and the rapidity with which it cleared up indicated some infectious or irritative condition outside of gonorrhea the remaining cases all showed at one time or another gonococci in the secretions. For practical purposes, therefore, vulvovaginitis should be termed gonorrhea. A correct appreciation of the etiological factors can only be obtained by considering the anatomy and histology of the lower genital tract in girls before puberty. Why is it that we find these infections not transmitted to little boys or to girls beyond puberty or to adults? The gonococcus grows most rapidly upon delicate squamous or cylindrical epithelium. Such delicate epithelium is found about the vulva and vagina in little girls, whereas in adults the epithelium is much denser and more resistant. Unfortunately the external genitals of girls are, so to speak, bare and everted before puberty, offering the best possible nidus for infection. With the increase in size of the labia majora, and above all the development of a hairy covering at puberty, the vestibulum vaginae is shielded from direct contact with the outside. In none of the cases that came to our clinic where we could exclude the possibility of sexual contact was there found any girl who was beyond puberty. This corresponds to the reports of other investigators.⁴

In analyzing the possible causes of this infection we must consider first the source, and secondly the manner of transmission. I realize of course the great difficulty of trying to analyze the various factors that deserve consideration, and feel that while we may have presumptive evidence along certain lines it is almost impossible, except in a few cases, to get absolute proof. The first question is whether the parents are the source of infection? Investigation showed that a large majority of these parents had had two or more children, that the mothers in only a few cases gave a history of a discharge, and that where a vaginal examination was made it was usually negative. In two instances, however, the mothers showed

⁴ Spaulding, *loc. cit.*; W. Hamilton, *Gonococcus Vulvovaginitis in Children*, Jour. Amer. Med. Assoc., April 9, 1910, i, 1196.

an acute gonorrhea preceding the infection in the child, and here she was probably the infecting agent. Other possible sources of infection are older brothers and sisters, other persons living in the same house or using the same lavatory, and finally other already infected girls of the same age. The last-named focus of infection is, as I will later try to show, the most important factor in the spread of the disease.

Now as to the manner of transmission. In only four children did the question of rape come up for consideration. In no case was there any external injury indicating this as likely. In one instance the mother accused a boy of sixteen as being responsible for the infection. He was arrested and an examination showed that he had not the slightest evidences of gonorrhea. German writers lay some stress upon the superstition among the lower classes abroad that an adult infected with gonorrhea can be cured by transmitting it to some innocent child. In none of my cases did this seem a probable explanation, and I was particularly impressed by the fact that only a few girls came from the ignorant, foreign-born population.

Etiological studies of the epidemics in children's hospitals indicate that the hand of the nurse may at times be a factor in the transmission of the infection. In how far can we consider this as of importance in the cases appearing sporadically in homes? Is the hand of the infected mother an important factor in transmitting infection to her child? I believe not. The small percentage of mothers who had a gonorrheal infection has already been noted. Even stronger evidence against this manner of infection lies in the fact that only two of our cases occurred in children under one year of age. Now just at this time the epithelium is most delicate and susceptible to infection, and the mother a dozen times a day is compelled to handle the genitals of the child. The relative absence of infection during these first twelve months speaks strongly, therefore, against the frequency of this manner of transmission.

Next we must consider the transmission through cloths, either in the form of clothing, towel, wash cloth, or bedlinen. The gonococcus, as is well known, is particularly susceptible to drying. While I am far from denying that this manner of transmission, especially through bedlinen, occurs from time to time, we must realize that cloth will absorb considerable of the secretion, and in the course of ten to fifteen minutes will ordinarily be dry enough not to be a serious source of infection.

We have yet to consider the bath and the lavatory as a means of transmitting infection. In institutions where a number of children are bathed one after the other it is readily possible that infection may be carried from one to another. We are, however, primarily concerned in this paper with the home cases, and here the greater interval between baths make the spread of gonorrheal

infection through this agency unlikely. In this country public baths are few in number, and usually consist of showers or a swimming-pool, where contamination of this sort would be uncommon.

In the lavatory seat, however, we have factors favorable for spreading this contagion. Secretion containing gonococci deposited here will, owing to the moisture of the surrounding air, remain a long time undried and virulent. Moreover, lavatories, even in grammar schools, are, as a rule, so high that the smaller children in using them are forced to have their genitals and clothing rub over a considerable portion of the seat. The greater the number of persons using the same lavatory the less interval of time is apt to elapse between its use, and hence the greater likelihood of carrying infection. The lavatory seat of the tenement-house districts is hence a source of great danger for little girls, particularly where it is rough or unclean. In the public schools, where at recess there is practically no interval in the use of the lavatory, the danger is even greater. Of course if we could keep all the infected girls from attending school the danger would be eliminated. We found, however, that a number of girls did not seek medical advice until after a profuse discharge had been present for several weeks, and that a number of lighter infections passed unrecognized and untreated for months. With the open formation of the genitals in girls and the unnatural high seat of the lavatory it is impossible for an infected child to avoid contaminating the seat with some of her discharge. I have not given figures regarding etiology from the social service investigation of the cases, because the evidence on which they were based varied so much in reliability. In some instances it was merely the statement of the mother. Where, however, we have record that a child of five years, whose parents, brothers, and sisters were free of gonorrhea, whose home lavatory was immaculate and used only by the family, became infected one and a half months after attending school, the interpretation can hardly be questioned. Furthermore, it is rather striking that in my own tabulation, as given below, 47 out of 66 girls were of school age or over.

Less than one year, 2; one to three years, 13; four to six years, 23; seven to nine years, 19; ten to twelve years, 9; total 66 cases.

I think, therefore, that it can be fairly said that the most frequent source of infection is from child to child, and that the most common manner of its transmission is through the school lavatory. This is in no wise a reflection upon the cleanliness of the public schools, but merely the result of special factors predisposing to contagion.

HOME CONDITIONS. While no portion of the city was exempt from this infection, not even the fashionable parts of town, the social service investigation revealed the fact that a majority of the families were of the poorer classes and lived in cramped quarters. Of the homes examined fifteen were extremely neat and clean,

ten were unsanitary in some respects, and nine of them were filthy. Only 11 of the 66 were colored girls. In the poorer homes and tenements there was usually one lavatory for the whole building used by everyone, and at times in bad condition. It was also common to find that the infected child slept with the mother or with a brother or sister. Until the social service worker or the visiting nurse visited the home there was usually not the slightest attempt at limiting the infection, and in three instances the result was that a sister of the patient had become infected.

SYMPTOMS. Few of the girls had pronounced discomfort. In the acute stage there was some increased frequency and burning on urination and a vaginal discharge. Usually, however, it was the mother who first noticed a yellowish stain upon her child's clothing, and on inquiry discovered the disease. Some children had a temporary enuresis during the active stage. At times the child would complain of feeling chafed. The course of the disease was almost invariably prolonged. Complications occurred rarely. Twice there was a gonorrheal proctitis, resulting from the use of an infant syringe for constipation. One patient had an attack of severe abdominal pain with fever and tenderness lasting one week, which in all likelihood was due to a tubal involvement. Two girls developed an ophthalmia, and one of these two likewise had an arthritis.

TREATMENT. So unsuccessful have been most of the methods of treatment suggested that some believe as much can be accomplished by simply leaving the cases alone. While realizing all the difficulties, I feel that such pessimism is not justified. Doubtless the general condition of the patient is an important factor. Fresh air, good food, and an iron tonic aid materially in effecting a cure. One child that had been under our care for almost a year, with but little relief, was cured by a summer in the country. In the acute infections, rest in bed, preferably in a hospital, supplemented by instillations of 25 per cent. argyrol give the best results. This should be supplemented by hexamethylamine, gr. i to iv, t.i.d. As to vaccine I agree with Dr. G. G. Smith,⁵ who recently stated: "We have not used vaccines, nor do we believe their employment in gonococcic infection of the mucous membranes, whether in the male or in the female, has up to the present given sufficiently satisfactory results to warrant any dependence on them."

An extended trial was made of the effect of the lactic acid bacillus. The tablets made by Parke, Davis & Co., were crushed and about 5 grains of the powder made into a small vaginal cocoa-butter suppository. The insertion of these suppositories was at times attended with some difficulty. These treatments were given three times a week for six to eight weeks. In three out of the ten cases in which this treatment was used there was a temporary

⁵ Treatment of Gonococcic Vulvovaginitis, Amer. Jour. Dis. Children, March, 1914.

cessation of discharge. In the other cases the result was so questionable that this form of treatment was abandoned.

I abstained from using the dry powder treatment with bolus alba⁶ and xerase,⁷ partly because of the numerous failures in the hands of others, but mainly because it is anatomically impossible of application. I had the same anatomical objections to the use of the vaginal douche in children. The corrugated surface of the vagina in these patients offers little if any opportunity for the effective use of either powders or irrigations. Moreover, we have but rarely sufficient discharge in the vagina to justify a douche. A more rational method to my mind is the repeated instillation, under slight pressure, of a small quantity of a somewhat stronger antiseptic solution. For this purpose I used the ordinary small rubber-tipped urethral syringe, pressed tightly over the hymeneal orifice. In accordance with the age of the child, from 15 to 60 drops of the solution are injected several times in succession. This balloons out the folds of the vagina and allows the solution to come in contact with every portion. While I favor the less irritating silver preparations in the very early stages, I found it best to go over as soon as possible to a 1 per cent. silver nitrate solution. In the last twenty-one cases treated over a period of five months I have been using 2 per cent. and even 4 per cent. silver nitrate solutions. It is surprising how little burning these stronger preparations caused and how satisfactory were the results obtained in the chronic cases. The 2 per cent. silver nitrate solution was used in girls under five years of age, and in those over five years the 4 per cent. solution was used once or twice a week in the late stages with good effect. I find no record of the use of such strong solutions by others, and believe my favorable results and the absence of any untoward symptoms justifies a further test of this treatment. My outline of treatment for vaginitis in a girl of school age would therefore be: first two weeks, rest in bed as much as possible, 25 per cent. argyrol injected twice daily if in hospital; third to fourth week, daily instillations of 1 per cent. silver nitrate solution; fifth to sixth week, instillations of 2 per cent. silver nitrate solution every other day; seventh to tenth week, instillations of 4 per cent. silver nitrate solution twice and later once a week. Finally if there is no more discharge for over a month, send to the country for one to two months without treatment.

Any form of treatment, however, will fail if it is not carried out systematically over a long period of time. Mattisohn⁸ complains that his results were frequently spoiled because parents failed to bring their children regularly. To overcome this I secured last

⁶ Nassauer, rev. in *Zeitsch. f. Kinderheilkunde*, 1913, iv, 111.

⁷ Cronbach and Tojbin, rev. in *Zeitsch. f. Kinderheilkunde*, ii, 224.

⁸ Die Prognose der Vulvovaginitis Gonorrhoeica Infantum, *Archiv f. Dermatol. u. Syph.*, cxvi, 817-840.

November the assistance of the Visiting Nurses' Association. On Saturdays the children were seen at the dispensary, treatment given, and the nurse who was present instructed in the home treatment for the coming week. Every day or every other day, depending on the case, the nurse gave the treatment at home and reported anything unusual to me. During the previous year, when we had no such system, we found that the mother soon tired of bringing her child until a bad relapse again forced her to have something done. Such haphazard treatment is hardly better than none at all.

PROGNOSIS. The results of treatment are difficult to judge because of the impossibility of saying whether a case is cured or not. The results of Dr. Smith's⁹ complement-fixation tests, particularly his second report published in March, 1914, indicate that even with this test we are at a loss to say positively when a cure is effected. This is, however, very different from denying the possibility of cure. Mattisohn⁸ has shown that even without active treatment eighteen out of thirty-one girls, after a period of two to five years, showed no discharge or gonococci, and that with active treatment about 75 per cent. should be cured in three to four months. Insufficient time has elapsed to state the outcome of a majority of our own apparent cures.

About 150 slides of vaginal secretion were examined microscopically in the course of the weekly treatments of the 19 cases that came to the dispensary since November 29. These slides were taken from every case once a week and brought out a number of interesting points: the frequency of recurrences or slight exacerbations, the change from a purulent to an epithelial discharge, the variation in bacterial flora, etc. I was repeatedly surprised how in the presence of but little discharge numerous intracellular gonococci were found. One typical record will serve to illustrate the course of the infection:

Dora W., aged three years. Smears showed:

November 29. Considerable pus, some intracellular and extracellular gonococci. No other bacteria. A few epithelial cells.

December 6. Considerable pus. Still a few intracellular gonococci.

December 13. A few leukocytes. Much epithelium. No gonococci.

December 20. Some pus. Considerable epithelium. Many bacteria, a few extracellular gonococci (?).

December 27. A few leukocytes. Epithelia abundant. A few extracellular diplococci.

January 3. Increased pus, some epithelium. A few intracellular gonococci.

⁹ Complement-fixation Test in Gonorrheal Vulvovaginitis, *Amer. Jour. Dis. Children*, 1913, v, 313-316.

January 10. Epithelium abundant; no pus; many bacteria.

January 17. Epithelium abundant; few bacteria.

January 24. Only epithelium.

February 14. A few epithelia; no pus; no bacteria.

February 28. Nothing on slide.

April 11. Only epithelia.

Some say these exacerbations of gonorrhea are due to reinfection, but this seems very unlikely. Usually the microscope has still shown some leukocytes present, even though there was no visible discharge. The isolation employed would exclude the possibility in most of our cases of reinfection as a cause. That there is a chronic nongonorrheal vaginitis following upon the wake of the true infection, as claimed by Smith,⁴ characterized by a chalky discharge, consisting almost wholly of epithelial cells, my examinations would corroborate. I do not think all these cases should be classed as uncured.

The ultimate danger to the child through this infection is difficult to estimate, although it probably rarely amounts to much. Yet every now and then we come across a case like the following:

Miss W., aged twenty-five years, consulted me May 11, 1914. She had had, ever since five years of age, some frequency of urination and a vaginal discharge. Was treated for pinworms by her family doctor. Dysmenorrhea since sixteen years of age. Pelvic symptoms. Examination shows hymen intact, urethra reddened, some mucopurulent vaginal discharge. Uterus retroverted. Tubes thickened, adherent, tender. Diagnosis: salpingitis and retroversion following gonorrheal vaginitis.

PREVENTION. I have left the consideration of preventive measures to the last because of its importance. Holt,¹⁰ Spaulding,¹¹ and others have suggested measures for the prevention of epidemics in children's hospitals, orphans' homes, and similar institutions. These consist of the following:

1. The examination of a vaginal smear from all girls before admission to determine the presence of gonorrheal infection. If present, the children are excluded.

2. Adequate facilities for isolating institutional cases with this infection in whom the diagnosis had not been made on admission.

3. Special nurse, separate fever thermometers, vaselin, etc., for the infected children.

While strict adherence to these precautions will almost invariably prevent epidemics in institutions, it does not influence the large number of endemic cases constantly to be found in our large cities. Very little thought and energy has thus far been directed to control

¹⁰ Gonococcic Infection in Children, New York Med. Jour., March 18, 1905, lxxxi, 521.

¹¹ Alice Hamilton, Gonorrheal Vulvovaginitis in Children, Jour. Infect. Dis., March 30, 1908, v, 147.

the spread of infection along these channels. Recently the Health Commissioner of New York, Dr. Goldwater, received a communication from the Superintendent of the City Schools of New York, stating that forty-eight children in the schools had been inoculated with some "loathsome disease" in the public hospitals of the city. Investigation showed that the municipal hospitals were not to blame, but that the disease was sufficiently prevalent to justify the serious consideration by the Health Department. I quote the following from his report.¹²

"That a form of vaginitis, which is bacteriologically indistinguishable from gonorrheal vaginitis, is a common condition among children in this city and elsewhere, is well known to clinicians.

"If a serious attempt were made to exclude from school all children who suffer from vaginitis, it would be necessary (a) to establish the machinery by which a complete physical examination of all female school children could be made; (b) to convince the public of the necessity of the proposed measure; (c) to establish the legal and moral right of the city authorities to require such an examination. Furthermore, inasmuch as the condition in question is one which, notwithstanding the most intensive treatment, often persists for months and even for years, it would be necessary to inaugurate a method whereby the education of excluded children could be continued. The only logical method would be to send private teachers into the homes of infected children.

"The questions here involved are among the most difficult and puzzling with which public health administrators have to deal. I am not aware that the problem has been solved anywhere, and can only promise, on behalf of this department, unremitting attention to it, in the hope that a working program may ultimately be formulated."

The interest of a man of Dr. Goldwater's experience in this problem will help greatly in its effective solution.

I should like to suggest the following additional preventive measures for the control of this disease:

1. *The instillation of a drop of 2 per cent. silver nitrate solution in the vestibulum vagina of all newborn girls whose mothers show evidence of gonorrhea.* I realize of course that probably not over 5 per cent. of the cases of vaginitis are infected at birth, but it seems to me that, particularly in maternity institutions, this precaution could certainly do no harm and would prevent a number of infections.

2. *Making vaginitis in children a disease reportable to the Board of Health.* It is probable that this would meet with considerable opposition at first, but since the disease is acquired innocently and usually from sources outside of the family, there could be no

¹² Cited in *The Modern Hospital*, May, 1914, p. 305.

question of violating professional secrecy by making such a report. If the Board of Health does not feel authorized to ask for such reports children attending the public schools could at any rate be reported to the department of hygiene of the schools so that the necessary steps to exclude their attendance during the active stage of the disease could be arranged for. Such reports to school authorities have been made by us for the last six months. I realize of course that there must be an element of compromise in this situation. We would not be justified in excluding the children from school for eight or nine months because of this disease unless there existed a special school, like the Frances Juvenile Home, in Chicago, where children with this disease could be given the necessary instruction. In St. Louis I have adopted the plan of allowing the children to return to their school work after about two months' treatment, provided there has been no visible discharge for several weeks. The teacher is, however, notified by the visiting nurse that the child is not to use the school lavatory. The nurse also sees to it that the child reports to the dispensary, at first once a week, later twice a month for reinspection over a period of five months. In case of any recurrence the child is kept out of school again until the active stage has completely subsided.

3. *Instruction of parents of infected children through the visiting nurse regarding preventive measures to limit the infection.* These measures would include the use of separate towels and wash-cloths, sleeping in a separate bed, care as to a thorough cleansing of any contaminated clothing, and special precautions in the use of the lavatory. It would of course be best for the child to use its own vessel instead of the common lavatory.

4. *Investigation by the visiting nurse as to the probable origin of the infection in each case with a view to excluding this factor from contaminating other children in the same house.* This would include the inspection of tenement lavatories, with a report to health authorities if they were found in an unclean condition. It would also include the supervision of infected children not attending school, or not of school age, to see that proper treatment is employed.

5. *The adoption of a U-shaped seat with low bowl and other precautionary measures to prevent the spread of infection through the public lavatories in schools, playgrounds, comfort stations, and tenements.* I consider this last-named suggestion the most important of all, and there is no valid reason why it could not to a large measure be put into operation at once. Paper coverings for lavatory seats have been used for purposes of cleanliness in some of the large hotels, and their employment in public places, such as schools, playgrounds, etc., would probably diminish the chance for infection. As, however, children could not be relied upon to apply such papers properly, it would be safer to use the U-shaped seat in addition. The height of the bowl should not be over eight inches where the

lavatory is to be used by children of school age. The presence of an attendant in the school lavatories, especially during recess, would aid materially in the discovery of girls having a discharge, in the proper use of the paper covers, and in the general cleanliness of the lavatory.

Gonorrhea in adults is so intimately connected with the public morals that any marked diminution in its prevalence seems like trying to reform the universe. Gonorrhea in little girls, on the other hand, is simply the result of inadequate sanitary precautions. The fact that hundreds of little girls are innocently infected with it every year in our large cities is a disgrace to the hygienic methods of the beginning of the twentieth century. Certainly we can say of gonorrheal vaginitis in children that one ounce of prevention is worth many pounds of cure.

DIRECT EXAMINATION OF THE DUODENAL CONTENTS (ALSO BILE) AS AN AID IN THE DIAGNOSIS OF GALL-BLADDER AND PANCREATIC AFFECTIONS.¹

BY MAX EINHORN, M.D.,

PROFESSOR OF INTERNAL MEDICINE AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL.

THE diagnosis of gall-bladder lesions is based upon the physical findings of the upper right abdomen in conjunction with the subjective symptoms and the objective data obtained. In typical cases of gall-stone disease there is no difficulty in recognizing the affection.

The characteristic symptoms are as follows: severe attacks of sudden pain in the upper abdomen appear at comparatively long intervals or years; they radiate to the back, often to the right shoulder-blade; are intense; last a few hours, or at the utmost two to three days, and leave as suddenly as they come. Frequently hypodermic injections of morphin have to be resorted to. During the attack the liver is usually increased in size; sometimes a more or less icteric discoloration of the eyes or skin is encountered; at times pronounced jaundice exists. A slight rise of temperature is often present in some of the attacks. During the interval there is perfect euphoria.

Frequently, however, the typical picture is lacking, and here we are at a loss to determine the trouble.

Still greater difficulties are encountered in the diagnosis of pancreatic lesions. A study of the function of this important organ

¹ Read before the American Gastro-enterological Association, at Atlantic City, N. J., June 22, 1914.